

PATTERN RECOGNITION

Bertrand Thirion and John Ashburner

- 1 INTRODUCTION
 - Classification and Regression
 - Curse of Dimensionality
- 2 GENERALIZATION OF LEARNED MODELS ACROSS DATASETS
- 3 OVERVIEW OF THE MAIN METHODS
- 4 MODEL AVERAGING

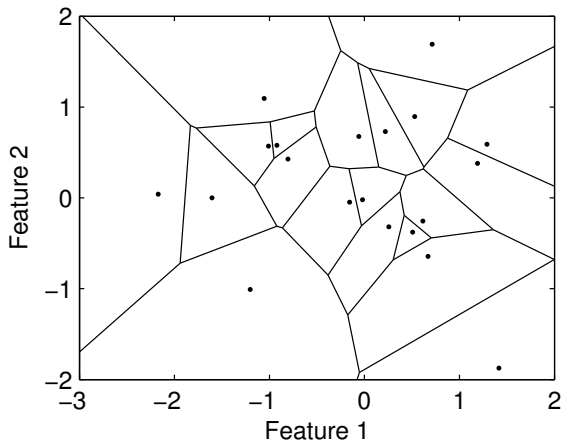
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CURSE OF DIMENSIONALITY

Large p , small n .

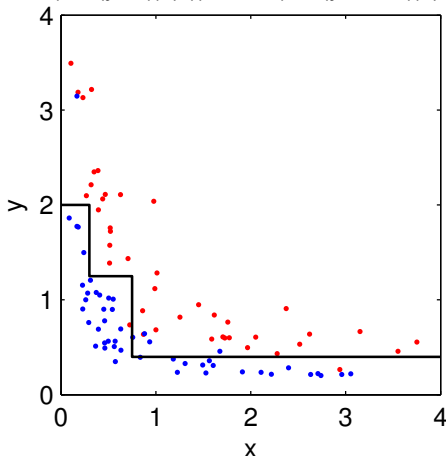
NEAREST-NEIGHBOUR CLASSIFICATION



- Not nice smooth separations.
- Lots of sharp corners.
- May be improved with *K-nearest neighbours*.

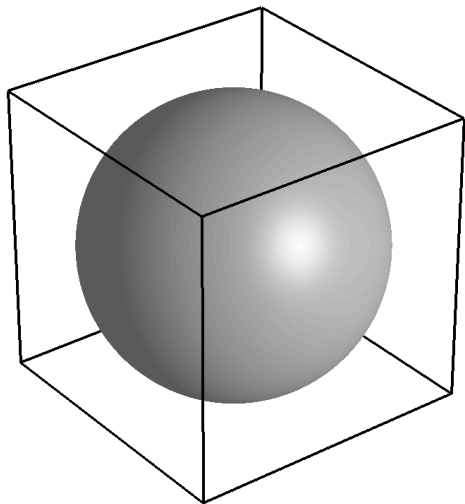
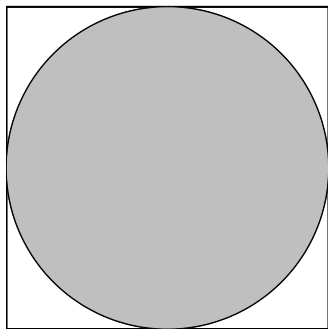
RULE-BASED APPROACHES

$$((x < 0.3) \ \& \ (y < 2)) \mid ((x < 0.75) \ \& \ (y < 1.25)) \mid (y < 0.4)$$

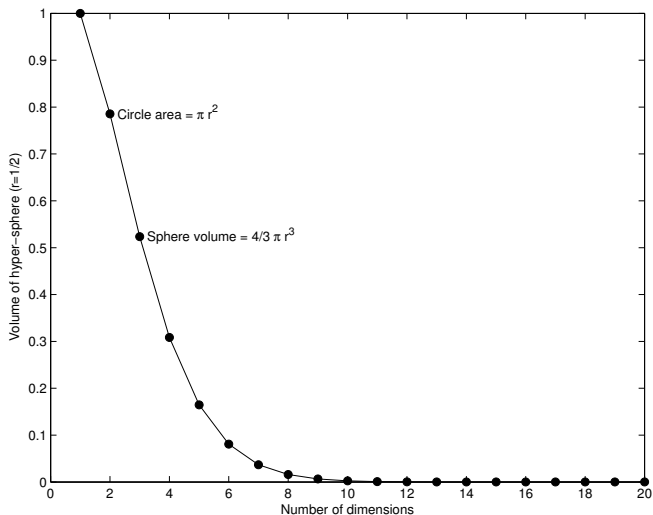
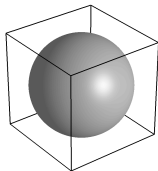
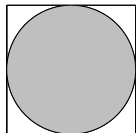


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CORNERS MATTER IN HIGH-DIMENSIONS



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 - Accuracy Measures
 - Parameter Tuning
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3 OVERVIEW OF THE MAIN METHODS

- Simple Methods: Naive Bayes, Linear Discriminant Analysis
- Kernel Methods: Support-Vector Machines, Gaussian Processes
- Basic Regularization Methods

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 - Boosting & Bagging
 - Tools: scikit-learn, pronto, nilearn, pymvpa

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